

Claims

What is claimed is:

1. A structural panel for use in building construction, comprising:
a first skin having a first surface and a second surface;
a first foam sheet having a first surface and a second surface;
a first membrane having a first surface and a second surface for retaining a portion of a fastener;
a second foam sheet having a first surface and a second surface; and
a second skin having a first surface and a second surface,
wherein the first foam sheet is fixed between the first skin and the membrane, the second foam sheet is fixed between the second skin and the member, and the membrane is fixed between the first skin and the second skin.
2. The structural panel of claim 1, further comprising a first interlocking edge and a second interlocking edge, the first interlocking edge configured to interlock with a second interlocking edge of a second structural panel, wherein the second interlocking edge of the second panel is similar to the second interlocking edge of the first panel.
3. The structural panel of claim 1, wherein the first foam sheet comprises expanded polystyrene (EPS) foam.

4. The structural panel of claim 1, wherein the first foam sheet comprises polyurethane foam.
5. The structural panel of claim 1, wherein the first skin comprises metal.
6. The structural panel of claim 5, wherein the first skin comprises steel.
7. The structural panel of claim 5, wherein the first skin comprises aluminum.
8. The structural panel of claim 1, wherein the first skin comprises wood.
9. The structural panel of claim 1, further comprising
a second membrane fixed between the first membrane and the second foam sheet
for retaining a portion of a fastener; and
a third foam sheet fixed between the first membrane and the second membrane.
10. A structural panel for use in building construction, comprising:
a first skin having a first surface and a second surface;
a first interior layer having a first surface facing the first surface of the first skin, a
second surface, and a hardness;

a second interior layer having a first surface facing the second surface of the first interior layer, a second surface, and a hardness;

a third interior layer having a first surface facing the second surface of the second interior layer, a second surface, and a hardness; and

a second skin having a first surface facing the second surface of the third interior layer;

wherein the hardness of the second interior layer is greater than the hardness of the first and third interior layers.

11. The structural panel of claim 10, wherein the hardness of the first and third interior layer is in a first range measurable by the durometer hardness measurement test, and wherein the hardness of the second interior layer is in a second range not coextensive with the first range.

12. The structural panel of claim 11, wherein the second range is measurable by the Brinell hardness test.

13. The structural panel of claim 11, wherein the second range is measurable by the Rockwell hardness test.

14. The structural panel of claim 10, further comprising a first interlocking edge and a second interlocking edge, the first interlocking edge configured to interlock

with a second interlocking edge of a second structural panel of similar configuration to the structural panel.

15. The structural panel of claim 14, wherein the second interior layer comprises steel.

16. The structural panel of claim 14, wherein the second interior layer comprises aluminum.

17. The structural panel of claim 10, wherein the first skin comprises metal.

18. The structural panel of claim 17, wherein the first skin comprises steel.

19. The structural panel of claim 17, wherein the first skin comprises aluminum.

20. The structural panel of claim 10, wherein the first skin comprises wood.

21. The structural panel of claim 10, wherein the first interior layer comprises a foam sheet.

22. The structural panel of claim 21, wherein the foam sheet comprises an expanded polystyrene (EPS) foam.

23. The structural panel of claim 21, wherein the foam sheet comprises a polyurethane foam.

24. The structural panel of claim 10, wherein the second interior layer comprises metal.

25. The structural panel of claim 10, wherein the second interior layer comprises wood.

26. The structural panel of claim 10, wherein the first and second skins and the first, second, and third interior layers are fixed with respect to each other.

27. The structural panel of claim 26, further comprises an adhesive.

28. The structural panel of claim 10, further comprising:
a fourth interior layer having a first surface facing the second surface of the third interior layer, a second surface, and a hardness;

a fifth interior layer having a first surface facing the second surface of the fourth interior layer, a second surface facing the first surface of the third interior layer, and a hardness, the hardness of the fifth interior layer being greater than that of any of the first, third, and fourth interior layers.

29. The structural panel of claim 28, wherein the hardness of the fifth interior layer is substantially similar to the hardness of the second interior layer.

30. The structural panel of claim 28, further comprising a first rib having a first edge joined to the second surface of the second interior panel and a second edge joined to the first surface of the fifth interior panel, the rib having a hardness greater than any of that that of the first, third or fourth interior layers.

31. The structural panel of claim 30, wherein the rib extends from a first edge of the structural panel to a second edge of the structural panel opposite the first edge.

32. The structural panel of claim 27, further comprising a second rib having a first edge joined to the second surface of the second interior panel and a second edge joined to the first surface of the fifth interior panel, the rib having a hardness greater than any of that of the first, third or fourth interior layers, and substantially parallel to the first rib.

33. The structural panel of claim 10, further comprising:
a building construction member facing the second surface of the first skin;
a fastener connecting the building construction member and the first skin, the fastener penetrating the first skin and the second interior layer.

34. The structural panel of claim 33, wherein the building construction member is a piece of roofing material.

35. The structural panel of claim 33, wherein the fastener is a screw.

36. The structural panel of claim 33, wherein the fastener is a nail.

37. The structural panel of claim 33, wherein the building construction material is a ceiling panel.

38. The structural panel of claim 33, wherein the building construction member is a ceiling support member.